EIP Bulletin

TENNESSEE EMERGING INFECTIONS PROGRAM

Tennessee Department of Health Communicable and Environmental Disease Services — August 2005

Spider Bite?? Think MRSA!

In the United States, *Staphylococcus aureus* is the most common cause of skin and soft tissue infections. Methicillin-resistant *Staphylococcus aureus* (MRSA) is resistant to ß-lactam antibiotics, including penicillinase-resistant penicillins (methicillin, oxacillin, nafcillin) and cephalosporins, and *has long been a recognized pathogen among hospitalized patients* and persons with certain healthcare-associated risk factors. In Tennessee, there has been a dramatic increase in the frequency of MRSA infections among otherwise healthy persons without typical healthcare-associated MRSA (HA-MRSA) risk factors. These MRSA infections are referred to as community-associated MRSA (CA-MRSA).

CA-MRSA infections have been defined as MRSA infections acquired by persons, who within the past 12 months, have not been hospitalized nor have undergone a medical procedure (such as dialysis, surgery, catheters). In contrast to HA-MRSA, CA-MRSA frequently is susceptible to trimethoprim-sulfamethoxazole, clindamycin, and tetracycline. Outbreaks of CA-MRSA have been described in inmates of correctional facilities, intravenous drug use, athletic teams and men who have sex with men. Close skin-to-skin contact, openings in the skin (cuts and/or abrasions), contaminated items and surfaces, crowded living conditions and poor hygiene (e.g., sharing of unwashed bath towels) have been identified as factors associated with spread of CA-MRSA.

MRSA infections in the community are usually manifested as skin infections, such as pimples and boils, and occur in otherwise healthy people. Local skin necrosis mimicking "spider bites" may occur (due to expression of the Panton-Valentine-Leukocidin (PVL) toxin commonly carried my strains of CA-MRSA). **Suspect MRSA infection whenever the differential diagnosis includes spider bite.**

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Tennessee *Shigella* Update, 2005

Shigella is a common cause of bacterial gastroenteritis, and causes substantial morbidity, particularly in daycare-aged children. Controlling community-wide outbreaks can be very challenging. It is important for clinicians to understand guidelines for management, including activity restrictions for potentially infectious patients, to help control its spread.

Shigella species are gram-negative bacilli with four major subgroups (*Shigella boydii, S. dysenteriae, S. flexneri and S. sonnei*). In recent years, 96% of cases in Tennessee have been *Shigella sonnei*, with 4% due to *S. flexneri*. Humans are the only reservoir for the pathogen, which is transmitted by fecal-oral contact. The disease is readily transmitted with a low infectious dose. The secondary attack rate among household members of infant cases is over 60%.[1] Shigellosis typically has an incubation period of 1-3 days, and commonly causes fever, abdominal cramps and voluminous watery stool which is often bloody. Without antimicrobial therapy, fecal excretion generally lasts 1-4 weeks, though long-term carriage can occur; appropriate antibiotics generally reduce this to a few days.

Rates of *Shigella* infection in Tennessee follow a cyclical pattern with peaks at 5-7 year intervals (**Figure 1**). Rates have been increasing since 2001, and are 3 times higher in the first half of 2005 than they were at the same time last year. The highest rates of disease occur in pre-school aged children, in whom close contact and suboptimal hygiene may contribute to spread (**Figure 2**). While cases may initially cluster within certain childcare facilities, typically infections disseminate rapidly to affect children, their caretakers and others throughout a community.

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Spider Bite?? Think MRSA! (continued)

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Clinical management of MRSA skin and soft tissue infections (SSTI)

Clinical management of SSTI should be determined by the clinical presentation, severity of the infection, the presence of comorbidities and presence of risk factors for CA-MRSA or HA-MRSA[1,2]. **Incision and drainage (I & D) is extremely important in treatment of abscesses and should be done whenever possible.** Fluctuant abscesses should always be treated with I&D and never with antibiotic therapy alone.

If there is no evidence of systemic toxicity (e.g., fever) and no uncontrolled comorbidities [e.g., peripheral vascular disease, diabetes mellitus, chronic venous insufficiency, morbid obesity] that may complicate treatment, patients may be treated with I&D and local wound care alone.

Antimicrobials should be considered if I&D is not possible (e.g., the lesion is not fluctuant), the patient is systemically ill (e.g., fever is present) or has any of the above comorbidities.

Options for empiric oral antimicrobial therapy for CA-MRSA include trimethoprim-sulfamethoxazole, clindamycin or a tetracycline. Rifampin or quinolones should NEVER be used alone, even if the isolate is susceptible, because of the rapid development of resistance to these agents. Antimicrobial therapy should be adjusted based on culture and susceptibility results.

Invasive MRSA [i.e., MRSA isolated from blood, cerebrospinal fluid (CSF), pericardial, pleural or joint fluids, organs, and bone] is a reportable condition in Tennessee.

Information for caregivers and patients with MRSA infection

Patients with MRSA infections, their family members and close contacts should be thoroughly counseled about measures to prevent spread of infection. Drainage from *S. aureus infections, wound dressings and other* materials contaminated with wound drainage are highly infectious.

Infection control messages for patients to prevent transmission of *S. aureus SSTI*, including MRSA include: (1) Keep wounds and lesions covered with clean, dry bandages. This is especially important when drainage is present. (2) Wash hands with soap and warm water or alcohol-based hand rub after touching infected skin and bandages. Put disposable waste (e.g., dressings, bandages) in a separate trash bag and close the bag tightly before throwing it out with the regular garbage. (3) Advise family members and other close contacts to wash their hands frequently with soap and warm water, especially if they change your bandages or touch the infected area or anything that might have come in contact with the infected area. (4) Consider using clean, disposable, nonsterile gloves to change bandages. (5) Do not share personal items (e.g., towels, washcloths, razors, clothing, or uniforms) or other items that may have been contaminated by wound drainage. (6) Disinfect all non-clothing (and non-disposable) items that come in contact with the wound or wound drainage with a solution of one tablespoon of household bleach mixed in one quart of water (must be prepared fresh each day) or a store-bought, household disinfectant. (7) Wash soiled linens and clothes with hot water and laundry detergent. Drying clothes in a hot dryer, rather than air-drying, may also help kill bacteria in clothes. (8) Wash utensils and dishes in the usual manner with soap and hot water or using a standard home dishwasher. (9) Avoid participating in contact sports or other skin-to-skin contact until the infection has healed. (10) Be sure to tell any healthcare providers who treat you that you have MRSA, a "resistant staph infection".

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Tennessee Shigella Update, 2005 (continued)

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Antimicrobial Resistance

In 2002, of *Shigella* isolates submitted to the National Antimicrobial Resistance Monitoring System (NARMS), 77% were resistant to amoxicillin, 37% to trimethoprim-sulfamethoxazole, 31% to tetracycline, 7% to cephalothin, and 3% to amoxicillin-clavulanate. Of 620 isolates tested, none were resistant to ceftriaxone or ciprofloxacin, though nalidixic acid resistance (which can be a harbinger of quinolone resistance) has been reported. Unfortunately, multidrug resistance is common, with 58% of isolates in 2002 resistant to ≥2 antimicrobial agents.[2] Of 80 *Shigella* isolates from Shelby County, TN tested during a community-wide outbreak in 2003, 91% were resistant to ampicillin/sulbactam, 56% were resistant to trimethoprim/sulfamethoxazole, and 41% were resistant to tetracycline.

Management

Stool cultures are indicated in persons with gastroenteritis who are immunocompromised, or who have bloody diarrhea, severe abdominal pain, many fecal leukocytes, or severe or persistent symptoms.[3] If *Shigella* is suspected, culture confirmation is important to determine antimicrobial susceptibility patterns, and to exclude other pathogens for which antibiotic treatment may be detrimental, as in *E. coli* O157:H7 or uncomplicated *Salmonella* infections (in which antibiotics may increase the risk of hemolytic-uremic syndrome and prolong excretion, respectively).

A number of excellent clinical guidelines are available addressing the diagnosis and management of *Shigella* and other enteric infections.[3-5] Recommended antibiotic regimens for *Shigella* include trimethoprim-sulfamethoxazole (if susceptible), nalidixic acid, quinolones, ceftriaxone and azithromycin. Of note, a non-absorbable antimicrobial agent, rifaximin, has recently been approved for use in the U.S. and is widely recommended for treatment of "traveler's diarrhea". While it may be effective for *Shigella*[6], this agent is not recommended for invasive infections involving fever or bloody

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Tennessee Shigella Update, 2005 (continued)

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stools.

Control Measures

Shigella infection is required to be reported to the Department of Health. This can be done by telephone or FAX reporting to the county health department. Health departments can assist with control measures and responding to outbreaks as appropriate. Strict attention to hand hygiene is critical in limiting spread. Symptomatic family members or contacts should be cultured and treated appropriately. Infected persons should be excluded from foodhandling. When *Shigella* is identified in a daycare setting, other symptomatic attendees and staff should be cultured. Symptomatic persons with stool cultures positive for *Shigella* should be treated as appropriate and excluded from the child care facility until diarrhea has ceased and stool culture is negative.[7] Local regulations may vary, and health departments will assist with control recommendations and community interventions during outbreaks.

While most *Shigella* infections are self-limited, the disease is easily transmitted and can cause substantial morbidity as it spreads rapidly within communities. Healthcare providers should educate patients and families carefully about infection control recommendations and work closely with the health department to prevent its spread.

Figure 1. Annual number of cases of *Shigella* infection reported to the Tennessee Department of Health, 1991-2004, demonstrating its cyclical nature. As of June 22, 2005 three times more cases have been reported to date this year compared to the same time last year.

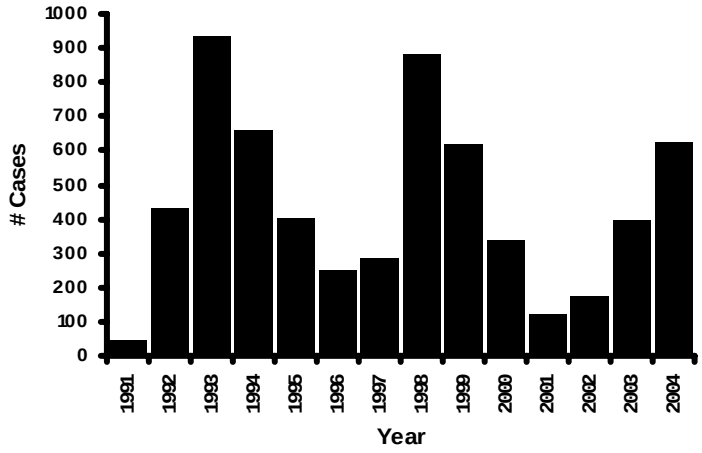
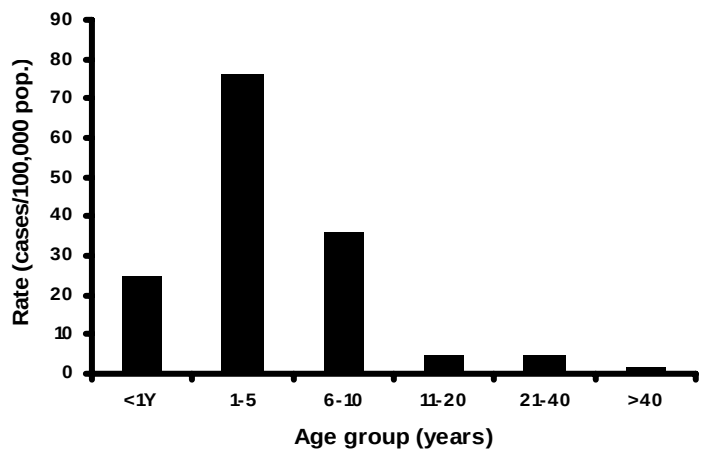


Figure 2. Rates of *Shigella* infection in Tennessee by age group, 2004.



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Estimating the burden of influenza hospitalizations in young children using two independent surveillance systems

Although influenza virus causes more hospitalizations and deaths among U.S. children than any other vaccine-preventable disease, deriving accurate population-based estimates of disease burden is challenging[1]. In response to the concern about large numbers of pediatric hospitalizations and deaths early in the 2003-2004 influenza season the CDC's Emerging Infections Program began active surveillance for pediatric influenza admissions midway through the 2003-2004 influenza season. The Tennessee Emerging Infections Program identified children aged 0-17 years admitted with a positive influenza clinical diagnostic test through active surveillance in hospitals in middle Tennessee. In addition to the new EIP influenza surveillance project, the New Vaccine Surveillance Network (NVSN) had been enrolling children aged <5 years hospitalized with respiratory symptoms/fever in three hospitals in middle Tennessee since 2000. In this study, each child enrolled was tested for influenza by culture and polymerase chain reaction in a research laboratory. These two independent surveillance systems operating in the same middle Tennessee county in 2003-2004 presented a unique opportunity to compare the two systems. Drs. Carlos Grijalva and Marie Griffin at Vanderbilt University performed an evaluation to estimate influenza-associated hospitalizations in children in Davidson County, Tennessee, 2003-2004.

This evaluation of two surveillance systems used capture-recapture techniques[2] to estimate the true number of children aged 0-4 years hospitalized in the surveillance hospitals in Davidson County. This statistical technique has been used by wildlife biolo-

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Estimating the burden of influenza hospitalizations in young children using two independent surveillance systems (continued)

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gists to estimate the number of animals in the wild – basing these estimates on the number identified by two independent surveillance systems and counting the number of animals captured than recaptured.

Using this technique, the estimated hospitalizations for children aged <5 years were 18 identified by the NVSN, 23 identified by the EIP and 11 identified by both surveillance systems (Table 1). Overall hospitalization rates were 2.4 per 1000 children in Davidson County, but rates increased in younger children peaking at 9.1 per 1000 in the <6 month old group (Table 2). This confirmed the work done by Dr. Kathy Neuzil and colleagues that showed very high hospitalization rates in young children (3). It also supports the current Advisory Committee on Immunization Practices recommendation for routine immunization of children aged 6-23 months against influenza each year. NVSN detected 84% of estimated community-acquired influenza cases and EIP detected 64% of cases in which an influenza clinical diagnostic test was performed.

In the face of fluctuating vaccine supplies, variable onset and severity of influenza seasons each year, and new recommendations for use of influenza vaccine in children, the need for accurate, informative influenza surveillance systems are great. During the 2003-2004 influenza season, this analysis of data from two independent influenza surveillance systems provided more precise estimates of serious disease rates than either system could have independently.

Table 1. Number of children aged <5 years hospitalized with influenza. Davidson County, influenza season 2003-2004

Number of children detected by surveillance systems			Estimates of influenza hospitalizations from capture-recapture (95% Confidence Interval)	
NVSN* alone	EIP** alone	Both NVSN and EIP	Undetected by both systems	Total estimated
18	23	11	38 (15 to 93)	90 (67 to 145)

*NVSN: New Vaccine Surveillance Network enrolled children 4 days per week. **EIP: Emerging Infections Program laboratory surveillance 7 days per week.

Table 2. Number of children aged <5 years hospitalized with laboratory-confirmed influenza, hospitalization rates and rate ratios. Davidson County, influenza season 2003-2004

Age	Influenza hospitalizations*	Population	Hospitalizations per1000	Rate Ratio (95 % Confidence Interval)
< 6 months	37 (27 to 59)	4056	9.1 (6.7 to 14.5)	11.1 (6.1 to 20.7)
6-23 months	35 (27 to 57)	11825	3.0 (2.3 to 4.8)	3.6 (1.9 to 6.7)
24-59 months	18 (13 to 29)	21932	0.8 (0.6 to 1.3)	Reference
Total	90 (67 to 145)	37813	2.4 (1.8 to 3.8)	

* Age distribution derived from the New Vaccine Surveillance Network

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